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ABSTRACT

An interim status report is presented on a study of predictors to aid in reducing the 35-40% dropout/failure rate in general chemistry at the Mississippi Gulf Coast Junior College, Perkinston Campus. Data from 1974-75 and 1975-76 were used to develop a formula whereby potentially weak students could be identified before they failed or dropped out of general chemistry. In 1976-77, mid-term lecture averages predicted by application of the formula were compared to instructors' grading scales to determine each student's relative predicted course proficiency. Students predicted not to achieve a passing grade at mid-term were selected to participate in special remedial laboratory sessions involving an intensive review of theory and application of material covered in regular course lectures and using a workbook designed to enhance problem solving ability. Sixteen or 32% of the 1976-77 class were chosen. Early program success was indicated by the fifth week during which no students dropped out; several dropouts had occurred by this time in previous years. By mid-term, eight students dropped out, five of whom were part of the remedial instruction group. Remedial sessions were seen to help 10 of the original 16 high risk students. Of those who completed the entire term, none received a failing grade. End-of-term statistics showed that application of the formula correctly identified 68% of the dropout/failures in general chemistry. (TR)

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PREDICTING MID-TERM GRADES

PHASE II

JC 780 131

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21 February 1977

PREDICTING MID-TERM GRADES: PHASE II

As a follow-up to the article "Predicting Mid-Term Grades"^{1,2} dated 22 April 1976, I have decided to write an interim report that I might give the status of the project begun nearly a year ago. In this article one finds that data collected for the years 1974-75 and 1975-76 were utilized in order to develop a mathematical relationship which would enable early identification of a potentially weak student. This early identification of a student with inherent weaknesses in the problem solving areas will hopefully result in a reduction of the dropout/failure rate experienced in general chemistry. At the present time, the dropout/failure rate for this introductory course is in the 30-40% range.

Utilization of the predicted mid-term lecture averages were compared to the grading scale presently in use by the instructors in order to determine relative proficiency of the students in the course. The scale consists of a ten point division between each grade assigned. This simply means that a 90 average would correspond to an "A" whereas an 80 average corresponds to a "B". Of particular significance is the the fact that the minimum average required in order to achieve a passing grade ("D") would be a 60. Any average which does not meet the criterion of being at least equal to 60 would, of course, be considered a failure. Plans for the utilization of the predicted mid-term scores of the 1976-77 students called for the recognition of those students who, theoretically, would not be able to achieve the mandatory "60" required to obtain a passing grade for the class.

Logically, the next question to be considered after determining which students have a high risk factor, is to decide what steps should be taken to alleviate or improve the situation. Usually, whenever a predictive scheme such as this is devised, there are numerous questions which arise as to the actual validity of the equation. Naturally, if the equation is inaccurate to the point of having no predictive validity then the equation would be worthless. This leads one to assume that the equation should be extensively tested in order to first establish predictive validity prior to attempting to incorporate the predictions into some feasible plan of reducing the dropout/failure rate.

On the other hand, from a humanistic standpoint, one must consider that throughout the testing period in which the predictive validity of the equation is being determined there are going to be students failing or dropping out of the course. Lack of appropriate action with respect to the predicted score would result in the probable failure of some students who might have passed had they been given additional help. This places a greater percentage of the blame for their failure on the instructor. Hopefully, the special attention that will result from the early identification of these weak students, together with the additional problem solving practice enhanced by the workbook,³ will improve the chances of poorer students achieving an acceptable level of progress. The contention of the chemistry department on our campus is that the primary factor of student failure is a direct result in inadequate problem solving ability. Therefore, this area will be the target for greatest concentration in the remedial laboratory sessions.

Returning to the idea of verification of the formula, it may still be possible to provide information for this purpose as well as serving our primary objective. That is, if those students not selected to participate in the special session are monitored and comparisons made between their actual and predicted mid-term grades, a correlation may be possible. Having selected 32% of the 1976-77 general chemistry body to participate in the problem solving sessions would allow the remaining 68% to participate in the verification process.

The remedial instruction provided to the potential dropout students consisted primarily of an intensive review of theory and application of material being studied in the lecture portion of the class. This was accomplished by converting one of the three general chemistry laboratories into a tutorial session rather than the traditional laboratory session. Coupled with the fact that the material was presented and reviewed by the laboratory instructor rather than the lecture instructor, the tutorial sessions provided the student with several opportunities for reinforcement.

In addition to simply reviewing the material another instrument employed was to utilize a workbook to assign problems for the students to practice. These problems are supplemental to those assigned in the lecture session. Since the tutorial group is small compared to the lecture class, the students have a better opportunity of presenting their difficulties and receiving instruction on a personal basis.

Early success of the program was indicated by not having a single dropout prior to the fifth week of the first semester. Previous years had resulted in several dropouts by this time, and, the bulk of the

dropouts by mid-term. The next few weeks witnessed the beginning of the dropout phenomenon. By mid-term, we had lost a total of eight students representing 16% of our initial enrollment. Of the eight students dropping the course, we had predicted five of them would have difficulty, one we had no prediction at all, and the other two we had predicted would pass. Of the two predicted to pass, one had a prediction score of 62 (only 2 points above the arbitrary cutoff) and the other had a predicted score of 83. (Incidentally, the average grade for that student at the time of dropout was 83!). Therefore, of the seven dropouts for whom a predictive score was available, we correctly identified five (71%). In addition to this apparently high correlation between predicted and actual dropouts, one must consider that two of the dropouts were counseled into changing to the Principles of Chemistry.

As is normally the case, the end-of-semester statistics were not much different from the mid-term values. A total of eleven students, representing approximately 20%, dropped or failed the course for the semester. Of these eleven, six had been predicted, two had no predictive score due to incomplete data, and three were predicted to pass. These figures represent an increase of one student in each of the three categories (predicted to fail, predicted to pass, no prediction) from the mid-term evaluation. This slight increase from mid-term substantiates the fact that the bulk of our dropouts, 73% in this case, occurs within the first nine weeks.

If only the students having a predicted score are considered, then

one realizes that application of the formula correctly identified 68% of the dropout/failures for the first semester of General College Chemistry at the Perkinson Campus of Mississippi Gulf Coast Junior College. The significance of this predictability lies in two areas: (1) the potential for the earliest possible identification of those students most likely to have difficulty with the course is now a reality, (2) once the weak students are identified, remedial instruction may be applied in order to help prevent their attrition from class. In this particular case, sixteen students were identified as extremely likely to drop or fail the course. Through remedial instruction, ten of those sixteen students performed satisfactorily. Another one or two would have passed the course had the instructors been able to prevent the student from dropping on his own. Not a single student of the select group that completed the entire term received a failing grade!

In conclusion, I would like to quote Dr. Leon Minear,⁴ Oregon State School Superintendent:

"We know a lot more about education than we practice. Educators should stop studying problems to death and start moving to solve them. There have been plenty of studies and they all come up with the same answers. But nobody does anything about them."

Now that there exists a relatively reliable method of predicting success, or rather a lack of it, in General College Chemistry on our campus, I intend to make full use of it! I entreat faculty members in all areas of study to attempt early identification rather than allowing the theory of "upward mobility" to rule your classroom!

The final phase of this documentary will be concerned with the ability of the select group to perform throughout the second semester of the course after having been returned to the traditional laboratory sessions. Monitoring of these students has already begun during the spring semester of the 1976-77 academic year. A subsequent report on the findings will follow.

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